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(54) Title: A RADIOFREQUENCY MAGNETIC FIELD RESONATOR AND A METHOD OF DESIGNING THE SAME

(57) Abstract: A radiofrequency (RF) resonator for magnetic resonance analysis, the RF resonator comprising: (a) at least two conductive elements, each having a first curvature along a direction perpendicular to a longitudinal axis, the at least two conductive elements being spaced along the longitudinal axis, so that when an RF current flows within the at least two conductive elements in a direction of the longitudinal axis, a substantially homogenous RF magnetic field, directed perpendicular to the longitudinal axis, is produced in a volume defined between the at least two conductive elements. The RF resonator further comprises (b) an electronic circuitry designed and configured for providing predetermined resonance characteristics of the RF resonator, for matching an impedance of the RF resonator to an impedance of an RF transmitter electrically communicating with the electronic circuitry, and for balancing the RF magnetic field to have a substantially symmetrical profile with respect to a transverse axis being perpendicular to the longitudinal axis.

WO 2004/036229 A2